

Asbestos-Related Disease in South Africa

The Social Production of an Invisible Epidemic

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South Africa was the third largest exporter of asbestos in the world for more than a century. As a consequence of particularly exploitative social conditions, former workers and residents of mining regions suffered—and continue to suffer—from a serious yet still largely undocumented burden of asbestos-related disease. This epidemic has been invisible both internationally and inside South Africa.

We examined the work environment, labor policies, and occupational-health framework of the asbestos industry in South Africa during the 20th century. In a changing local context where the majority of workers were increasingly disenfranchised, unorganized, excluded from skilled work, and predominantly rural, mining operations of the asbestos industry not only exposed workers to high levels of asbestos but also contaminated the environment extensively. (*Am J Public Health*. 2006;96:1386–1396. doi:10.2105/AJPH.2005.064998)

JOB OR HEALTH? THIS WAS the “choice” workers unknowingly made when they first began to mine the rich deposits of asbestos in South Africa during the late 19th century. For many in former mining regions, the loss of their livelihoods as the industry retrenched a century later still looms large. However, more is at stake for these workers than the loss of jobs. For asbestos workers and communities around the mines, the hidden cost of exploitive work practices and mining operations is their health.

Rich deposits of 3 commercial asbestiform minerals make South Africa unique, and this country produced most of the world’s supply of crocidolite (blue) and amosite (brown) asbestos and a smaller proportion of chrysotile (white) asbestos throughout the 20th century. The last mine closed in 2002 and left in its wake what a South African journalist forecast in 1984 would be “South Africa’s largest public health disaster.”⁴ Yet, outside of

South Africa, little is known about South Africans’ disease experience or how local conditions under which asbestos was mined, milled, and manufactured produced disease.

Although the precise moment when the industry became aware of the hazardous properties of asbestos remains a subject of intense controversy, by 1928, 1948, and 1959, the scientific evidence that asbestos fibers caused asbestosis (a progressive fibrotic disease of the lungs), lung cancer, and mesothelioma, respectively, was incontrovertible.⁵ Moreover, South African researchers were central players in the global circulation of scientific knowledge about asbestos. They hosted the 1930 International Conference on Silicosis in Johannesburg, where asbestosis was acknowledged as a new occupational disease.⁶ Later, they provided definitive evidence of the etiological association between asbestos and mesothelioma. Nonetheless, as numerous activists and scholars

have shown, the asbestos industry successfully suppressed, manipulated, and distorted knowledge about asbestos for nearly a century, thus ensuring its continuing operations.⁷

Historians of the asbestos industry in South Africa, such as Jock McCulloch, have understandably focused on the myriad ways in which the industry sought to escape accountability and liability for its practices. Uncovering this history has been of great importance in legal settlements, efforts to lower exposure, and campaigns to ban asbestos. The invisibility of asbestos-related disease in South Africa, however, involves more than suppression and manipulation of knowledge. What has been neglected in these accounts is that the scientific model of disease causation⁸ itself has helped to make this epidemic invisible by limiting analysis to the physiological action of asbestos fibers, thereby separating disease from its social roots.

During the past few decades, public health scholars, practitioners, and activists have argued convincingly that more broadly contextualized notions of disease causality—in which social, political, and economic conditions are integrated with biological knowledge—would provide more effective guides for developing disease prevention strategies. We have reconceptualized asbestos-related disease causality in the specific context of South Africa through an exploration of the connections between workplace organization, occupational-health legislation, and disease during the 20th century. We argue that this epidemic was not simply the result of ignorance or deliberate manipulation of information. Rather, this epidemic and its invisibility were shaped by industrial labor policies and practices and governmental legislation that took specific and changing forms during settler colonial rule and apartheid in South Africa.

CONDITIONS OF LABOR IN THE ASBESTOS INDUSTRY

Asbestos prospecting and land speculation began on isolated farms in the Northern Cape Province during the early 1880s soon after the discovery of diamonds in nearby Kimberley and during the conquest of African societies by British and Afrikaner colonists. Eventually, prospectors uncovered a rich belt of crocidolite asbestos that extended 240 miles to the Botswana border (Figure 1); the asbestos was marketed to Europe and North America.⁹ Chrysotile deposits were discovered in 1905 near Barberton, and the small-scale mining of amosite in the Pietersburg fields of northeastern Transvaal began around 1907.¹⁰ British-based companies operated

through local subsidiaries and dominated the asbestos industry for much of the 20th century.

From the earliest years of the industry, asbestos mining and the knowledge systems associated with mining were part of an intricate global network of producers and users. Their operations and profits in South Africa were facilitated by racialized and gendered labor policies that were established gradually during the early colonial era, intensified during segregation after the union of

South African colonies in 1910, and consolidated in a particularly brutal form with the ascendancy of the National Party in 1948. Unlike the competing Canadian and Italian asbestos mines, the extraction of mineral in South Africa during the late 19th century and early 20th century was dominated by small companies, syndicates, and individual producers who then sold their products to multinational companies.¹¹ During the early years of the asbestos industry, mining relied on manual

“The mining of asbestos in Mafefe after 1900 was like a spear sharpened to inflict wounds on the body of the village.”

Z. M. Mabiletja¹

“With asbestos we have a real problem here. It is all over. It will affect us and our children. I say this as a mother.”

Resident of Ncweng²

“I know that money can't buy life, but if a person has money, sometimes he or she can go to doctors . . . but if you got nothing, you just sit.”

Brown Matseke³

extraction of mineral from small surface adits (Figure 2), because deposits of asbestos were scattered irregularly over vast regions of rural South Africa. This was often done by contract laborers, most of whom were black¹² and were not employed directly by the companies.¹³ With the family as the primary unit of labor in the Cape Asbestos Belt, female and child labor was integral to the functioning and profitability of the industry and to the survival of families.¹⁴ Men did the heavy manual labor—drilling, blasting,

and loading rock into wheelbarrows or cocopans (a steel wagon that runs on rails). Women and children hand-cobbed (separated asbestos from the host rock into clumps the size of an egg), sorted ore, sieved fiber, and weighed and packed loose asbestos into bags for transport.¹⁵

Although the population of South Africa was still primarily rural during the early 20th century, blacks were increasingly alienated from the land through colonial taxation and land policies, which were formalized in the

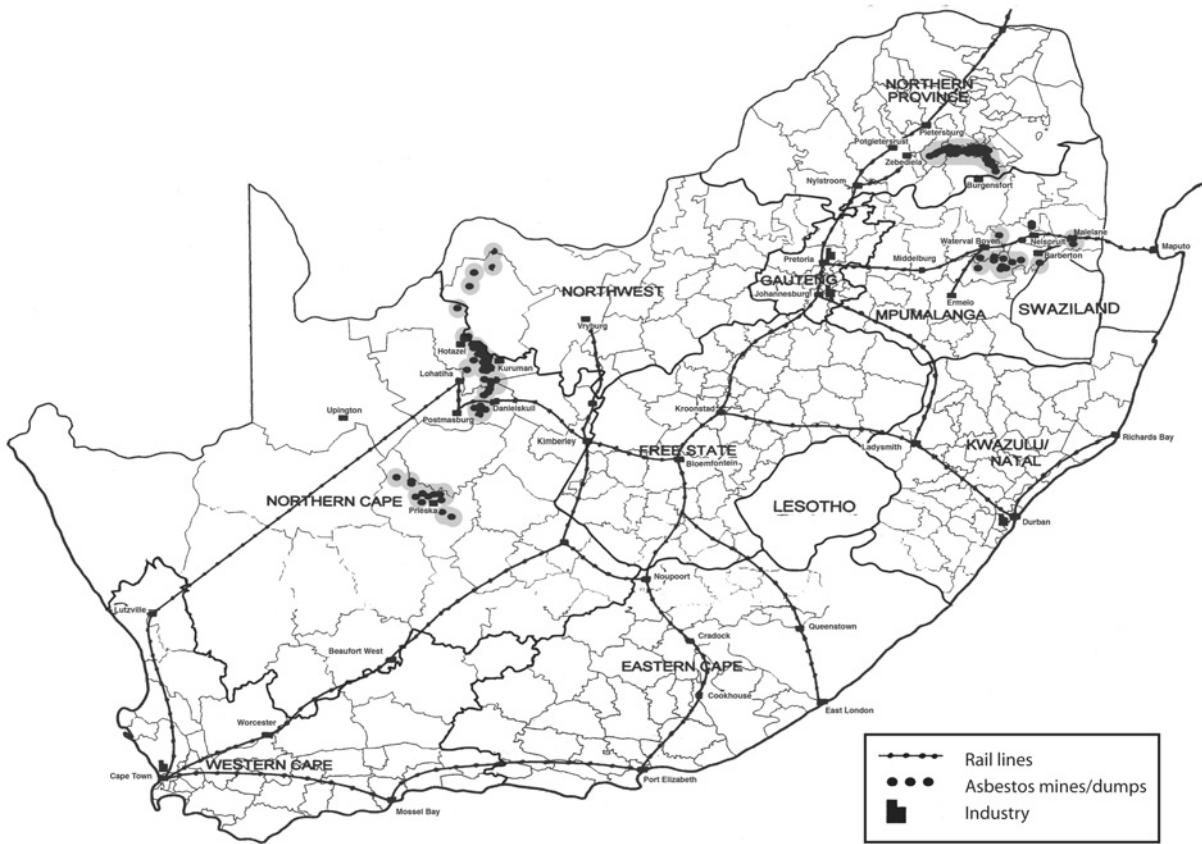


FIGURE 1—Map of South Africa depicting the location of former mines, factories, and railroad lines that carried asbestos to ports for export.

Source: Parliament of South Africa.

Native Land Act of 1913. The act placed tighter controls on tenancy, segregated land ownership more and more rigidly according to perceived racial distinctions, and contributed to the migration of young men to the gold and diamond mines.¹⁶ Because of these conditions, asbestos mining had certain attractions in that it allowed rural people to maintain independence of the family unit, keep livestock on mine property, and earn wages that were high compared with farm labor.¹⁷ Black male asbestos miners also were permitted to blast, which was a skilled activity denied to most black miners in the gold mines. In the Northern Cape, farmers repeatedly complained to local authorities about the independence of black labor.¹⁸ Moreover, resistance to the harsh conditions of migrant work in the gold and

diamond mines was undoubtedly important to families. Indeed, throughout this period, blacks showed great resilience and adaptability in the face of inhumane colonialist practices and policies.¹⁹

It is important, however, to not overemphasize the quality of life for asbestos miners. Rural life at the time was shaped by the internal dynamics of African societies, climactic conditions, and structural constraints that reflected the power of settler colonialism.²⁰ There is little evidence that workers earned anything other than a meager existence or that the labor conditions were satisfactory. Miners had to supply their own explosives, had many debts for food and clothing, and were generally paid in “good-fors,” similar to vouchers or tokens, which were redeemable

only in company stores. According to Anthony Hocking, official historian of the Northern Cape mining industry, at the end of the month, “Only the fortunate ones obtain[ed] a larger or smaller amount of cash.”²¹

This informal family-based structure had numerous advantages for the companies: it allowed them to keep capital investment and labor costs to a minimum; it freed them from the dictates of mining legislation, because workers were not registered as miners; and it made associations between the production process and disease easier to ignore.²² The asbestos companies shifted the major financial burden of an uncertain world market and crises of oversupply to the independent miners, who were not official employees. This insulated the companies from cycles of

boom and bust that were a chronic feature of the industry beginning in the early 1890s.²³ In 1926, a government official wrote in the *Cape Times* that “this [labor] system has many drawbacks.” Nonetheless, he argued, “It appears as if it were the only method of running the industry with any chance of success. Under it a steady worker, with his ‘stampers,’ can make a good living, according to native standards.”²⁴

By the late 1920s, asbestos mining was slowly becoming more formal, but this did not bring about a major improvement in working conditions. Some mining companies continued to operate through the contract labor or tributor system (where mining companies bought the asbestos from self-employed miners); others hired miners who were paid daily.²⁵ Women remained central to the production process and cobbled and sorted as employees, although they were frequently unregistered employees.²⁶ With the postwar expansion of asbestos markets, more underground mines were built and milling was slowly mechanized. However, because of the supply of cheap labor, informal mining with women cobblers coexisted with mechanized operations well into the second half of the 20th century.²⁷

State policies helped shape the racialization and the gendering of labor in asbestos mines. Rather than just direct supervision of workers, for example, control of labor in asbestos mines also was accomplished indirectly with some regional variation through increasingly restrictive legislation—such as the National Labour Regulation Act of 1911, the Urban Areas Act of 1923, the Native Trust and Land Act of 1936, and

pass laws—that regulated the areas where and the conditions under which black South Africans could live and work. As mining became more formal, a racial division of labor was consolidated when the higher-paying and skilled positions of engineers, mine managers, supervisors, and secretaries were reserved exclusively for white labor. Differential work conditions and pay are a vivid memory to former miners, one of whom recently recalled with great bitterness that during the 1970s, wage differentials for the identical job were at least 10-fold.²⁸ Brown Matseke, a former asbestos worker from the North-West Province, left the industry in 1968 after 6 years because of 11-hour work days, a lack of rest periods, intolerable heat, and wages that failed to provide even minimal support for his family.²⁹

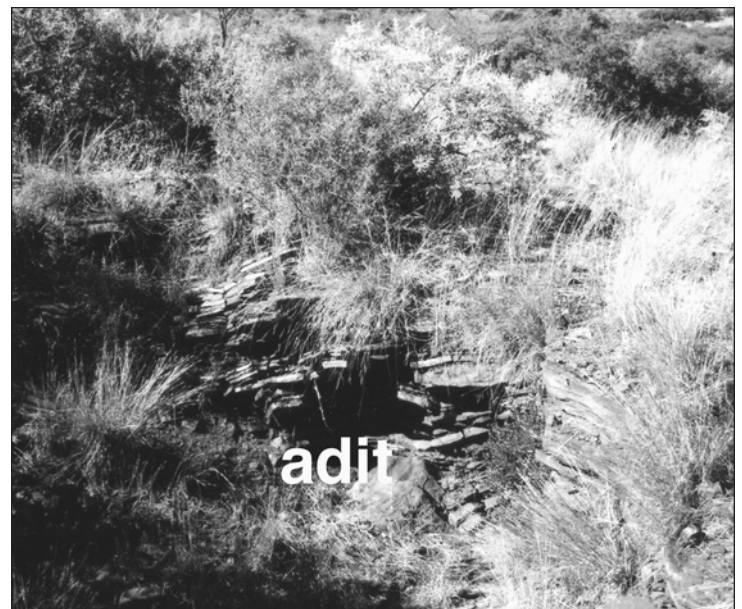
THE WORKPLACE AND DISEASE

The informal organization of the asbestos industry and the living conditions of the majority of South Africans produced patterns of exposure and disease that differed from those of the asbestos industry in either North America or Western Europe. For example, because men, women, and children worked together, the entire family was at risk for disease. While there was no documentation of exposure levels until the 1940s, it is possible to determine from Hall and Hocking’s description of asbestos mining and milling³⁰ that at each stage of production, exposure to fiber was high and occurred at much younger ages than anywhere else in the world. Miners lived immediately adjacent to the mines, and during the early years, they worked in isolation. Thus, whole

families endured not only occupational exposure but also environmental exposure to asbestos. The exposure of women and children to asbestos was particularly intense, because they were involved in the extraction and bagging of fiber from the host rocks above ground, where the climate was dry and windy.³¹ Indeed, Hocking documented young children’s exposure in his descriptions of mothers who cobbled under camelthorn trees, with their babies lying on soft asbestos fibers while they worked.³² Such stories are confirmed by Itumeleng Sethole, a retrenched worker, who was brought to the asbestos mines as a baby with his shopkeeper father.³³

With the advent of more formal mechanized mining and milling operations during the second half of the century, dust exposures remained high. A spokesperson for one company claimed that after learning about the hazards of asbestos during the 1940s and 1950s, South Africans worked hard to reduce risk³⁴; however, interviews with ex-miners and residents of mining communities suggest otherwise.

FIGURE 2—An asbestos adit on a hillside in the North-West Province, 2002.



When asked to describe the environment in the mines, men and women who worked in them between the late 1950s and early 1990s spoke of extremely dusty conditions. Furthermore, no protective respiratory equipment, gloves, or training were provided by the company.³⁵ During the 1980s, dust levels were particularly high in the sorting room, where women sorted fiber from host rocks and swept the floors.³⁶ Workers also had to eat in the mines amid the asbestos dust.³⁷ Stephen Kotoloane, a minister who frequented the mines at the end of the workday, recalled that he was often unable to recognize people when they emerged from the mines because they were covered in dust.³⁸ One health worker expressed fear of exposure to asbestos in mine offices where tufts of asbestos were still visible during the 1990s. “Someday this could happen to me,” the worker stated anxiously while pointing to the X-ray of a former miner who had mesothelioma.³⁹ These workers’ experiences received ample confirmation in quantitative studies more than 2 decades ago that showed exposure levels were at least 10 times higher in South Africa than in Europe during the late 1970s.⁴⁰ Moreover, unlike Britain, where asbestos industry regulations were implemented in 1931 and were revised substantially in 1969, South Africa only enacted statutory limits to exposure outside of the mining industry in 1987.⁴¹

Workers in the Northern Cape mines migrated from Malawi, Mozambique, Lesotho, Swaziland, Botswana, and Namibia and lived in hostels during the term of their contracts. When the contracts expired, the majority returned to their country of origin, and their disease experiences

were not included in the limited number of South African statistics. Other miners from local areas either lived with their families or lived in hostels during the week and returned to their families during weekends—either way, they all brought asbestos fibers into their homes.⁴² According to Justice Senatle, who worked in the mines near Kuruman from 1963 to 1978, the dust was so irritating that workers could not enter sorting rooms unless the doors were kept open. After spending the day handling asbestos, he would literally spend hours at home “pulling the fiber out physically by hand.”⁴³ To relieve respiratory irritation, many workers tied handkerchiefs around their faces. Because there were no laundry facilities in the mines and workers supplied their own clothing, women washed the handkerchiefs and all other clothing at home by hand, thus exposing entire families to airborne fiber on a regular basis.

Similar to the mines and mills, asbestos-related disease among factory workers, many of whom were migrant workers, also was undocumented. It was only when the growing trade union movement of the 1980s made implementation of more stringent standards for asbestos exposure central to negotiations that workers learned about the hazards of the asbestos fibers. According to Fred Gona, a former full-time shop steward for the Construction and Allied Workers Union (CAWU),⁴⁴ workers at the Everite Cement factory in Brackenfell did not know why they were dying. “If a worker became ill, the company would fly or drive him to a rural area and dump him to die there, knowing that no post-mortem would be conducted.”⁴⁵ Indeed, this practice of “dumping”

sick workers in rural reserves—which was a consistent theme in our interviews—might in part account for company claims made in 1984 that only 71 cases of asbestosis out of a total workforce of 24 000 people had been diagnosed at Everite plants since 1946.⁴⁶ In contrast, audits of workers in the asbestos cement industry by health activists during the 1990s showed a 30% prevalence rate of asbestos-related disease.⁴⁷ Thus, in a process of “externalizing risk,”⁴⁸ communities in rural reserves, where there was almost no access to health care,⁴⁹ bore the full burden of undiagnosed disease.

CONTAMINATION OF THE ENVIRONMENT

What is striking to any contemporary visitor to the asbestos mining regions in the Northern Cape, Limpopo, or Mpumalanga Provinces is the sheer number of people who suffer from asbestos-related disease, many of whom did not work in the mines. Mesothelioma among men and women in their 30s and 40s is not uncommon. Virtually every resident has a relative or friend who is sick or who has died from what residents call “asbestos.”

The number of contemporary sources of environmental exposure to asbestos in South Africa is unimaginable in either Europe or North America. These sources include unrehabilitated or partially rehabilitated dumps, dried riverbeds, roads, transport spillage, deteriorated housing materials, factory emissions, and a variety of manufactured products.⁵⁰ (Many sites of exposure are known only to local residents who are currently mapping asbestos contaminated sites.) The unrehabilitated dumps that dot

the landscape throughout rural provinces are of particular concern to communities (Figure 3). During early years of the industry, independent producers worked on small surface deposits, which not only exposed them to asbestos but also produced widespread environmental contamination, thus blurring any distinction between occupationally and environmentally acquired disease.

In the late 19th century and the first half of the 20th century, workers lived in makeshift huts that were interspersed with the small surface mines and surrounded by tailings (waste products of mining). Later, many workers lived on mine property in hostels built with asbestos-containing materials, often directly beneath the large mines. Urban hostels, such as the one at Brackenfell where former asbestos cement workers still live, also were built with asbestos-containing materials.⁵¹ Because companies did not maintain the hostels, the walls and roofs of the building are now in a state of disrepair, and retrenched workers, who live in the hostels with their families, are exposed to airborne asbestos. Thus, exposure to asbestos through both work and the contaminated environment was—and is—continuous, intense, and largely undocumented. Despite the lack of firm data, most would agree that exposure to asbestos is a serious disease burden for exposed communities.

The reasons for such extensive contamination, high levels of exposure, and invisibility of disease are associated not only with industrial practices during the first half of the 20th century but also with specific political policies of the apartheid government, such as that of forcible



removal of blacks from their homes to areas far from their place of employment and far from productive agricultural land.⁵² Beginning in the 1950s in the Northern Cape, residents endured multiple forced removals from well-watered land around Kuruman to semi-arid and dusty villages in “African reserves,” which became the “homeland” of Bophutatswana, where many of the abandoned mines are located (now the North-West Province).⁵³ In northeastern Transvaal, the state bought land with unrehabilitated dumps from a multinational asbestos company (Turner and Newall) to expand the “homeland” of Lebowa, which became “self-governing” in 1972.⁵⁴ Because the state made few provisions for housing before resettlement,⁵⁵ residents were left with no alternative but to use any material available for constructing their houses. One material available in the Northern Cape and northeastern Transvaal was asbestos, which

residents mixed with sand to make bricks. Some of the mining companies and small businessmen also made bricks on their premises and sold them to people in surrounding villages.⁵⁶ Entire villages now have asbestos roofs.

There were many other sources of environmental exposure to asbestos from both mining and secondary industries. During the 1940s, bags of asbestos were put to a variety of creative uses on farms before shipment (e.g., chairs).⁵⁷ During the mid-1960s, workers used discarded asbestos bags as tents in their compounds.⁵⁸ At Everite, workers used asbestos bags during the workday for warmth and for a variety of purposes in the hostels.⁵⁹

In rural South Africa, asbestos tailings were used extensively in gravel roads, schools, and athletic fields. Animals graze—and continue to graze—on unrehabilitated dumps. Mines and mills also were built near rivers, which led to the contamination

FIGURE 3—Large masses of dried blue asbestos fibers mixed with mine tailings in a partially rehabilitated dump close to human settlements in the Northern Cape Province, 2001. Arrow indicates asbestos.

of water supplies. In 1930, a large mill in Prieska was built a few hundred meters from the Orange River. Although the mill closed during the late 1960s, as of 2001, large clumps of dried blue asbestos fibers lined the riverbanks where people frequently search for wood and where children swim (Figure 4). Similar conditions exist around the former Koegas mine outside of Prieska, which also was built alongside the Orange River.⁶⁰ During the 1980s in villages of northeastern Transvaal, journalists reported that people had to walk through abandoned dumps to get to their huts and that children used the dumps as sand-pits.⁶¹ Although the mines have closed in South Africa, many mining sites near villages have not been rehabilitated, which guarantees a high level of exposure to hazardous asbestos fibers for the foreseeable future.

EVADING REGULATION AND SILENCING THE EPIDEMIC

The occupational-health framework that evolved during the 20th century allowed the asbestos industry to both evade regulation and externalize the cost of compensation to government, workers, and communities, thus playing a key role in silencing the burden of asbestos-related disease nationally and internationally.⁶² The construction of this framework, which governs surveillance, exposure levels, and compensation, was shaped by a number of political, economic, social, and biological factors. First, the industry was organized informally for much of its duration, because it only required low-wage labor and minimal capital investment to be profitable. A second factor was the importance of the asbestos

industry to local economies and impoverished reserves, which made it likely that industry and government authorities would ignore any evidence of disease. For example, underground and surface sampling of dust levels by the mines inspectorate only began during the 1940s, but local inspections were sporadic, and the recommendations of the inspectors, minimal though they were, were disregarded.⁶³ Third, the interests and actions of the British-dominated mining industry, the agricultural sector, and Afrikaner nationalism were contradictory and often prohibited legislation. Fourth, latencies of 15 years or more between exposure and development of asbestos-related disease meant that most mine workers would have returned to their villages where no healthcare was available before developing symptoms. Because the symptoms of asbestos-related disease are similar to other respiratory disease, such as tuberculosis or silicosis, it was difficult for workers to discern a specific association between asbestos and what they refer to as their “chest complaints.” An additional factor that hobbled occupational-disease recognition and legislation was white workers’ decision to exclude black workers from their organizing efforts.⁶⁴

Beginning with the 1902 strike by rock drill supervisors immediately after the South African War (1899–1902) (historically known as the Anglo-Boer War), and fueled by media publicity in England, white miners, most of whom were migrants from the depressed tin-mining regions of Cornwall, protested the extraordinarily high and rapid mortality rates from respiratory disease (much of which was silicosis) that were evident after

FIGURE 4—Blue asbestos along the banks of a dried riverbed in the Orange River in the town of Prieska, 2001. Arrows indicates asbestos.



only short periods of labor in the gold mines. Labor activity, followed by the general strike of 1913,⁶⁵ led to the appointment of several Commissions of Inquiry, a series of Miner's Phthisis Acts, and the establishment of the Miner's Phthisis Bureau in 1916.⁶⁶ However, the framing of trade union rights in terms of race and the resultant exclusion of black miners from membership in the newly organized Mine Workers Union (MWU) hardened the discriminatory system of wages, working conditions, and legislation. It also established the basis for a racially divided labor movement that would facilitate collaboration between industry and the state in limiting implementation of meaningful preventive measures for occupational disease among white and black workers alike.

Legislation enacted in 1912 provided for periodic medical examinations that served as the basis of the British system set up in 1925,⁶⁷ but for black workers, the system was unequal. White workers could select their own doctors. Black workers, however, only had access to manager-appointed doctors, who worked in inadequate facilities beholden to their employer. As A. P. Cartwright, official historian for the Mine Medical Officers Association, stated so unequivocally, "Mine doctors in those days were regarded by mine managers as members of their administrative staff and subject to their orders."⁶⁸ Consequently, medical exams focused primarily on tuberculosis and pneumonia and ignored the role of living and mining conditions in the development of disease.⁶⁹ However, because asbestos mines were not registered until 1953, asbestos miners were not

even entitled to the cursory medical exams won by gold miners,⁷⁰ thus excluding them from the compensation system.

Similar to other legislation, such as the Immorality, Population Registration, and Group Areas Acts of 1950, occupational health legislation entrenched racial divisions after the ascendancy of the apartheid government in 1948 and further marginalized black workers. Monitoring of asbestos-related disease only began in 1954, when asbestos mines were brought under the control of the Silicosis Act (No. 47 of 1946), which provided for preemployment exams, regular medical screening, and benefits for asbestos miners—at least theoretically. Under the Pneumoconiosis Act (No. 57 of 1956), asbestos mines became controlled mines, but access to clinical exams and radiological services remained racially based, which ensured that access to what was by international standards⁷¹ a sorely inadequate compensation system would remain elusive. For the majority of workers, this meant that disease was grossly underdiagnosed.

The Occupational Diseases in Mines and Works Act (ODMWA) of 1973 further codified race-based standards of surveillance. Because this act only applied to miners, both those who were exposed through environmental contamination and unregistered workers, including many women, were excluded from the compensation system—and they remain excluded to this day. White miners had a statutory right to yearly x-rays by state-employed doctors at the newly established Medical Bureau for Occupational Disease. Surveillance for black workers, however, continued to take place in the mines by company doctors.

Because company doctors owed their livelihood to mine owners, there was little incentive to diagnose diseases with a longer latency than the worker's tenure in the mine.⁷² Indeed, this history of neglect by company doctors is a poignant one for former workers.⁷³ Only during the 1980s, when the National Union of Mineworkers (NUM) began working with activist physicians, did a systematic reassessment of mine doctors' work begin.⁷⁴

Revision of the ODMWA in 1993—which reflected the efforts of South Africa's new government to dismantle the legislative edifice of the apartheid state—nonetheless retained many of the structural inequities of the past, although not in a strictly racialized form. Because of inadequate infrastructure and resources inherited from the past, the time frame for compensation is long, and many former miners still lack knowledge about their rights to a basic medical examination—the key method by which disease is diagnosed.⁷⁵ Many occupational health researchers have argued that the ODMWA needs to be completely rewritten.⁷⁶

Of critical importance is that compensation to workers is minimal, which reflects the fact that the compensation system from its inception was never designed to provide any real economic security or dignified living for the majority of workers. As David Rosner argued in the US context, worker's compensation represented a deeply problematic trade-off of health and safety for money.⁷⁷ However, while US workers receive somewhat secure, if inadequate, compensation, this is not the case for South African workers. Moreover, because wages were determined historically by race, compensation

differentials are large and perpetuate the racial inequities in South African society. Workers in asbestos manufacturing industries were covered by the Workmen's Compensation Act, which was later superseded by the Compensation for Occupational Diseases and Injuries Act (COIDA) in 1993. Notably, COIDA does not require postemployment surveillance. The surveillance that does exist is the result of negotiated settlements between labor unions and companies.⁷⁸

Black labor militancy was, in fact, critical to the recognition of the hazards of asbestos. Because there were few white workers in the asbestos mines, the MWU was weak and was not active in pressuring the industry to improve dusty conditions.⁷⁹ However, despite the tremendous impediments that the South African state posed to their organizational efforts, the strike activities by black workers, including asbestos workers, increased during World War II.⁸⁰ Between 1939 and 1945, there were 304 officially recorded strikes by black workers.⁸¹ In 1945, black workers went on strike at the large Koegas-Westerberg asbestos mine, which led to some minor improvements in living conditions.⁸² The subsequent defeat of the African MWU in 1946 set organizing efforts back by several decades, although there were at least 2 strikes at asbestos mines that raised health concerns during the extreme repression after the Sharpeville massacre in 1960.⁸³ It is noteworthy that these strikes occurred at a time when the British Trade Union Congress (TUC) was involved in revising asbestos regulations in the United Kingdom. Unfortunately, despite the militancy of British dockworkers, the TUC

failed to link their efforts with those of the raw asbestos producers.⁸⁴

In South Africa during the 1970s, the economy slowed and the government was challenged by strike waves in Natal, youth protests that were triggered by the 1976 killing of Soweto schoolchildren by police, the emergence of the Black Consciousness movement, and the intensification of domestic opposition. After limited recognition in 1979, trade unions began organizing in earnest, and by the early 1980s, they were a major force in shaping political opposition.⁸⁵ Although asbestos was not nearly as important to the South African economy as gold, trade union activity reached the asbestos mines. Tightly controlled Work and Liaison Committees that were set up by companies in many industries, including asbestos, to forestall unionization failed to address worker's grievances,⁸⁶ and unions made headway linking economic, political, and health issues. For example, one active union at the amosite-producing Penge mine—the Black Allied Mining and Construction Workers' Union (BAMCWU)—launched a bitter strike in 1984. This was followed by a national anti-asbestos campaign that sharply addressed workers' trade-off of jobs for health. "We don't envisage a situation," unionists asserted, "where we would choose to die in order to earn very little. We'd rather starve than sell our lives."⁸⁷ Shortly thereafter, in 1986, the General Workers Union negotiated the first health and safety agreement in the asbestos industry.⁸⁸

CONCLUSION

The absence of data on asbestos-related disease during the

lifetime of the South African industry under apartheid is noteworthy because of the South African government's intensive program of surveillance and control of the movement of blacks and what political scientist Deborah Posel called the National Party's "mania for measurement."⁸⁹ Unlike pneumonia or tuberculosis,⁹⁰ asbestos-related disease did not affect labor recruitment or productivity in the short-term because of their long latency. Surveillance of the health of the majority of asbestos miners thus did not figure into the apartheid government's agenda.

South Africa has many well-known health problems, such as HIV infection and tuberculosis. The rate of silicosis among gold miners is high. Although occupational disease is neglected the world over, the burden of occupational disease is especially invisible in South Africa.⁹¹ As we have argued, the reasons for the invisibility of the epidemic of asbestos-related disease are many and interconnected. They include exploitive labor conditions in the asbestos industry; living conditions for the majority of South Africans that were barely survivable, especially in rural areas; a century of legislation that avoided statutory limits to exposure and that established systems of surveillance and compensation favorable to industry; limitations on black trade union bargaining power; the chronic nature of asbestos-related disease; and concepts of disease causality that exclude social conditions.

However, at the root of this silence are deeply entrenched and widely accepted cultural assumptions about the human worth of workers, which according to historian Karl Figlio are grounded in "the contract form of employment

in the 19th century [that] formalized the recognition and acceptance of risk as a natural feature of employment."⁹² Occupational disease thus became defined as an accident on the basis of shared understandings that the health effects of workplace exposures were natural, inevitable, and acceptable. Indeed, since the late 19th century, the multinational asbestos industry, the state, and white South African society operated under the shared assumption that workers' health was an unfortunate but unavoidable price for national prosperity.

The asbestos mining industry is no longer in operation. High-profile court cases against asbestos mining companies have brought some visibility to the problem in South Africa and limited financial relief to some affected people. Nonetheless, the scale of environmental contamination and the widespread use of manufactured products will continue to have a devastating impact on the health of South Africans. The challenge for the future is to develop effective public health prevention programs that go beyond technical solutions. One way to begin this process is to recast our understanding of disease causality by integrating historical knowledge about the social and political conditions that produce disease with biological understandings of the pathogenicity of asbestos fibers. ■

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Human Participant Protection

This research was approved by the Brown University institutional review board.

End Notes

1. Z. M. Mabiletja, quoted in Z. M. Mabiletja, M. A. Felix, L. Roodt, "Participatory Research, Community Action: The Mafefe Experience" (unpublished paper, July 1989).
2. Residents of Ncweng, South Africa, Interview by the Asbestos Collaborative, July 12, 2001.
3. Brown Matseke, Interview by Lundy Braun, July 5, 2004.
4. Phillip van Niekerk, "Blue and White Disaster," *New Statesman*, October 19, 1984. The longevity of the asbestos industry in South Africa is noteworthy. Crocidolite mining ceased in 1996, 30 years after the only other crocidolite-producing mine in the world at Wittenoom in Australia shut down. By 1965, British dockworkers were refusing to handle asbestos. By 1979, Sweden had banned the use of asbestos.
5. F. W. Simson, "Pulmonary Asbestosis in South Africa," *British Medical Journal*, May 26, 1928: 885–887; Richard Doll, "Mortality from Lung Cancer in Asbestos Workers," *British Journal of Industrial Medicine* 12(1955): 81–86; J. C. Wagner, "Some Pathological Aspects of Asbestos in the Union of South Africa,"

- in *Proceedings of the Pneumoconiosis Conference Held at the University of Witwatersrand, Johannesburg*, 1959, ed A.J. Orenstein (London: J. & A. Churchill Ltd, 1960). 383–390; C.A. Sleggs, P. Marchand, C. Wagner, “Diffuse Pleural Mesothelioma in South Africa,” *South African Medical Journal* 35(1961): 28–34.
6. E.L. Middleton, *Report on the International Conference on Silicosis* (London: His Majesty’s Stationery Office, 1931). George Frederick Slade’s 1931 thesis, based on his studies on a chrysotile mine in the Transvaal was one of the most detailed descriptions of the clinical features and prevalence of asbestosis up to this time. Although the thesis was never published, it was conducted in collaboration with the South African Institute for Medical Research (SAIMR), a world-renowned research institute. His findings were thus undoubtedly widely disseminated internationally. Thirty years later, Wagner, Sleggs, and Marchand, established the link between mesothelioma and asbestos due to occupational and environmental exposure.
 7. Paul Brodeur, *Expendable Americans: The Incredible Story of How Tens of Thousands of American Men and Women Die Each Year of Preventable Industrial Disease* (New York: Viking Press, 1974); Jonathan Myers, “Asbestos and Asbestos-Related Disease in South Africa,” *Saldru Working Paper No. 28* (Cape Town: Southern African Labour and Development Research Unit, 1980); Paul Brodeur, *Outrageous Misconduct: The Asbestos Industry on Trial* (New York: Pantheon Books, 1985); Robert Proctor, *Cancer Wars: How Politics Shapes What We Know and Don’t Know About Cancer* (New York: Basic Books, 1995); Barry Castleman, *Asbestos: Medical and Legal Aspects*, 4th ed. (Englewood Cliffs, NJ: Aspen Law & Business, 1996); Geoffrey Tweedale, *Magic Mineral to Killer Dust: Turner & Newall and the Asbestos Hazard* (Oxford: Oxford University Press, 2000); Jock McCulloch, *Asbestos Blues: Labour, Capital, Physicians & the State in South Africa* (Oxford: James Currey & Bloomington: Indiana University Press, 2002); David Egilman, Corey Fehnel, Susanna Rankin Bohme, “Exposing the ‘Myth’ of ABC, ‘Anything But Chrysotile’: A Critique of the Canadian Asbestos Mining Industry and McGill University Chrysotile Studies,” *American Journal of Industrial Medicine* 44(2003): 540–557.
 8. As Charles E. Rosenberg has written, the notion of disease as specific physiologic entities, which structures almost every dimension of current medical practice and research, evolved during the last century. See, for example, “The Tyranny of Diagnosis: Specific Entities and Individual Experience,” *The Milbank Quarterly* 80(2002): 237–260.
 9. A.L. Hall, *Asbestos In the Union of South Africa*, Memoir 12 (Pretoria: The Government Printer, 1930); P. Snyman, “Safety and Health in the Northern Cape Blue Asbestos Belt,” *Historia* 33(1988): 31–52; Anthony Hocking, *Kaia & Cocopans: The Story of Mining in South Africa’s Northern Cape* (Johannesburg: Hollards, nd), 30–32; McCulloch, *Asbestos Blues*, 8.
 10. Hall, *Asbestos In the Union of South Africa*; Marianne Felix, Jean-Patrick Leger, Rodney Ehrlich, “Three Minerals, Three Epidemics—Asbestos Mining and Disease in South Africa,” *The Identification and Control of Environmental and Occupational Diseases: Asbestos and Cancer: Advances in Modern Environmental Toxicology*, Vol. XXI, eds. M. Mehlman and J. Upton (Princeton: Princeton Scientific, 1993). 265–286; the northeastern Transvaal is now Limpopo Province, formerly the Northern Province.
 11. Hall, *Asbestos In the Union of South Africa*, 91; McCulloch, *Asbestos Blues*, 32.
 12. Under the Population Registration Act of 1950, rescinded in 1991, the apartheid government created a political classification system that placed South Africans into one of the following categories: African/black, coloured, and European/white. In this paper, we use the term “black” in its political sense to refer to people who were historically disenfranchised by the apartheid government and by the even longer experience of colonial rule.
 13. Hocking, *Kaia & Cocopans*, 40.
 14. Hall, *Asbestos In the Union of South Africa*, 92; Hocking, *Kaia & Cocopans*, 42–43; J. Davies, B.G. Williams, M.A. Debeila, D.A. Davies, “Asbestos-related Lung Disease Among Women in the Northern Province of South Africa,” *South African Journal of Science* 97(2001): 97:1–6; McCulloch, *Asbestos Blues*, 143–164; Nancy Jacobs, *Environment, Power, and Injustice: A South African History* (Cambridge: Cambridge University Press, 2003). 135.
 15. In Canada, it was old men and young boys who “cobbled” asbestos fibres, Ozonoff, “Failed Warnings: Asbestos-related Disease and Industrial Medicine,” ed. Ronald Bayer *The Health and Safety of Workers: Case Studies in the Politics of Professional Responsibility* (New York: Oxford University Press, 1988). 149.
 16. William Beinart, *Twentieth-century South Africa* (Oxford: Oxford University Press, 1994). 9–58; Jacobs, *Environment, Power, and Injustice*, 76–95, 117–172.
 17. McCulloch, *Asbestos Blues*, 24; Jacobs, *Environment, Power, and Injustice*, 135–141.
 18. McCulloch, *Asbestos Blues*, 98–99.
 19. Beinart, *Twentieth-century South Africa* 17; Jacobs, *Environment, Power, and Injustice*.
 20. Beinart, *Twentieth-century South Africa*; Jacobs, *Environment, Power, and Injustice*.
 21. Hocking, *Kaia & Cocopans*, 41.
 22. McCulloch, *Asbestos Blues*, 27; Jacobs, *Environment, Power, and Injustice*, 36–37.
 23. Ozonoff, “Failed Warnings,” 150–151.
 24. Quoted in Hocking, *Kaia & Cocopans*, 41.
 25. Hocking, *Kaia & Cocopans*, 67.
 26. According to Hocking (*Kaia & Cocopans*, 80), another category of female worker, widows or “women without men,” were not considered employees. They worked alone, scavenging for waste asbestos to sell to mining companies at the end of the month.
 27. McCulloch, *Asbestos Blues*, 164.
 28. Katholo Justice Senatle, Interview by Lundy Braun, July 4, 2004.
 29. Brown Matseke, Interview.
 30. Hall, *Asbestos In the Union of South Africa*; Hocking, *Kaia & Cocopans*.
 31. Davies et al., “Asbestos-related lung disease among women,” Jock McCulloch, “Women mining asbestos in South Africa, 1893–1980,” *Journal of Southern African Studies* 29(2003): 413–432.
 32. Hocking, *Kaia & Cocopans*, 69.
 33. Itumeleng Sethole, Interview by Lundy Braun, September 21, 2003.
 34. Hocking, *Kaia & Cocopans*, 167–168.
 35. Itumeleng Sethole, Interview.
 36. Gloria Dikledi, Interview by Lundy Braun, September 21, 2003.
 37. Brown Matseke, Interview.
 38. Stephen Kotoloane, Interview by Lundy Braun, 21 September 21, 2003.
 39. Anonymous worker, Interview by Lundy Braun, July 5, 2004.
 40. Myers, “Asbestos and asbestos-related disease,” 45–54.
 41. HMSO, *Asbestos Industry Regulations 1931* (London: SR&O, 1931); HMSO, *Asbestos Industry Regulations 1969* (London: HMSO, 1969); *Asbestos Industry Regulations 1987* (Pretoria: Government Printer, 1987).
 42. Addison Oepeng, Interview by Lundy Braun, July 3, 2004; Katholo Justice Senatle, Interview.
 43. Katholo Justice Senatle, Interview.
 44. CAWU merged with the NUM in 2000.
 45. Fred Gona, Interview with the Asbestos Collaborative, June 15, 2001.
 46. Correspondent, “Workers Hit By Asbestos,” *The Star*, January 19, 1984.
 47. Sophie Kisting, “Asbestos Contaminated Land in South Africa: The Challenges and Possibilities,” (Plenary session, Global Asbestos Congress, Osasco, Brazil, September 17–20, 2000).
 48. Richard Spoor, “The Social Consequences of Mining in South Africa in the Past and in the Future,” (unpublished paper, 2002).
 49. Neil Andersson and Shula Marks, “The State, Class and the Allocation of Health Resources in South Africa,” *Social Science and Medicine* 5(1989): 515–530.
 50. South African Department of Labour, “Draft Guidelines on the Management of Asbestos Related Problems,” 2000, 6.
 51. Former workers from Everite Asbestos Cement Factory, Interview by the Asbestos Collaborative, June 15, 2001.
 52. Rodney Davenport and Christopher Saunders, *South Africa: A Modern History* (Great Britain: MacMillan Press Ltd, 2000), 429–430; 466–471.
 53. Jacobs, *Environment, Power, and Injustice*, 164–172.
 54. Phillip van Niekerk, 1984, “US Steel Holds Interests in Asbestos Dumps,” *Rand Daily Mail*, September 1, 1984.
 55. Nigel Worden, *The Making of Modern South Africa: Conquest, Segregation and Apartheid* (Oxford: Blackwell, 1994), 111.
 56. Addison Oepeng, Interview; Phillip van Niekerk, “Lebowa Children Play Happily on the Dumps of Death,” *Rand Daily Mail*, August 3, 1984.
 57. Anonymous, Interview with Lundy Braun, July 5, 2004.
 58. Brown Matseke, Interview.
 59. Former Everite Asbestos Cement Factory workers, Interview.
 60. Members of Concerned People Against Asbestos, Interview with the Asbestos Collaborative, July 4, 2001.
 61. van Niekerk, 1984 “Lebowa children.”
 62. Report of the Department of Health, Republic of South Africa, Committee on Occupational Health, January 1996, 3.
 63. McCulloch, 117–135. Snyman, “Safety and Health,” 9–13.
 64. Francis Wilson, *Labour in the South African Gold Mines* (Cambridge: Cambridge University Press, 1972);

F.A. Johnstone, *Class, Race, and Gold* (London: Routledge and Kegan Paul, 1976); V.L. Allen, *The History of Black Mineworkers in South Africa, Vol I: The Techniques of Resistance, 1871–1948* (West Yorkshire: The Moor Press, 1992); Elaine Katz, *The White Death: Silicosis on the Witwatersrand Gold Mines, 1886–1910* (Johannesburg: Witwatersrand University Press, 1994); Rajen Naidoo, “The Social and Political Influences on the Development of Occupational Health in South Africa since the 1880s” (unpublished manuscript, 2005).

65. As Elaine Katz outlines in “White Workers’ Grievances and the Industrial Colour Bar, 1902–1913,” *The South African Journal of Economics* 42(1974): 127–156, the reasons for labor militancy in the period 1902 were complex. In addition to concerns about health, white miners objected to any relaxation of the colour bar, low wages, lack of recreation time, Sunday work, control of benefit funds, and the contract system of labor.

66. A.P. Cartwright, *Doctors on the Mines: A History of the Mine Medical Officers’ Association of South Africa* (Cape Town: Purnell, 1971), 137; Katz, *The White Death*, 113–116.

67. Middleton, *Report on the International Conference*, 9.

68. Cartwright, *Doctors on the Mines*, 38.

69. Katz, *The White Death*, 113; Packard, *White Plague, Black Labour: Tuberculosis and the Political Economy of Health and Disease in South Africa* (Berkeley: University of California Press, 1989), 174–184.

70. Myers, “Asbestos and Asbestos-Related Disease,” 48; Felix, Leger, Ehrlich, “Three Minerals, Three Epidemics,” 280.

71. This is not to imply that international standards were at that time or at the present adequate to compensate workers for the loss of their health.

72. Each of the asbestos-related diseases has a long and highly variable period between initial exposure to asbestos and the development of disease. Latency for asbestosis is approximately 15 years, depending on the level of exposure, for lung cancer approximately 20 years, and for mesothelioma between 20 and 50 years.

73. Residents of Gamopedi, Interview with the Asbestos Collaborative, 16 July 2001.

74. By monitoring workers differentially on the basis of race, the compensation system had the added effect of shaping whose disease was documented through research. Consequently, many

of the most important longitudinal studies in South Africa involve only white workers. See, for example, George Sluis-Cremer and Eva Hnizdo, “Progression of irregular opacities in a group of asbestos miners who ceased exposure compared to a group who continued exposure.” *British Journal of Industrial Medicine* 46(1989): 846–852.

75. The Asbestos Collaborative. “Asbestos-Related Disease in South Africa: Opportunities and Challenges Remaining Since the 1998 Parliamentary Asbestos Summit,” *Report to the South African Government*, October 12, 2001, http://www.brown.edu/Departments/Africana_Studies/Asbestos/index.html. Residents from many different villages in the Northern Cape asserted repeatedly that they did not know how the compensation system worked. Similarly, many physicians in the region knew little about the specifics of the process.

76. Fareed Abdullah, Mohammed Jeebhay, Jonny Myers, “Occupational Diseases in Mines and Works Act (Opinion),” *South African Medical Journal* 84(1994): 132–133; J.C.A. Davies, “Sound an Alarm!,” *South African Medical Journal* 84(1994): 133–134; Neil White, L. Bozalek, Jonny Myers, Rodney Ehrlich, “Compensation for Occupational Injuries and Diseases Bill,” *South African Medical Journal* 83(1993): 719–720. According to the terms of the current ODMWA, compensation is based on past salary. However, because salaries historically were based on race in industry, compensation in effect remains race-based.

77. David Rosner, “When Does a Worker’s Death Become Murder,” *American Journal of Public Health* 90(2000): 535–540.

78. Fred Gona, Interview.

79. Myers, “Asbestos and Asbestos-Related Disease,” 51; Felix, Leger, Ehrlich, “Three Minerals, Three Epidemics,” 280. In his unpublished “Social and political Influences on the development of occupational health in South Africa since the 1880s,” 2005, Rajen Naidoo makes this argument about occupational health legislation more broadly.

80. Jeremy Baskin, *Striking Back: A History of Cosatu* (Johannesburg: Raven Press, 1991), 10–12; Allen, *The History of Black Mineworkers*, 344–427.

81. Allen, *The History of Black Mineworkers*, 360.

82. Snyman, “Safety and Health,” 14.

83. Snyman, “Safety and Health,” 18.

84. Asbestos Regulations. Comments on Preliminary Draft and Statutory Draft. Discussion from the TUC, 1967–1968, Public Records Office,

National Archives for the United Kingdom, LAB 14/2109.

85. Beinart, Twentieth-century South Africa, 212–235; Davenport and Saunders, *South Africa: A Modern History*, 425–458.

86. Justice Senatle, Interview.

87. Phillip van Niekerk, “Union Calls For Boycott of Asbestos Products,” *Rand Daily Mail*, October 12, 1984; Black Allied Mining & Construction Workers’ Union (BAMCWU), “Asbestos: A Position Paper by BAMCU,” October 11, 1984.

88. General Workers Union, “Health and Safety Agreement at Turnall: A First in South Africa,” *South African Labour Bulletin*, 11(1986): 42–46.

89. Deborah Posel, “A Mania For Measurement: Statistics and Statecraft in the Transition to Apartheid,” in *Science and Society in Southern Africa*, ed. Saul Dubow (Manchester: Manchester University Press: 2000).

90. Packard, *White Plague, Black Labour*; Randall Packard, “The Invention of the ‘Tropical Worker’: Medical Research and the Quest for Central African Labour on the South African Gold Mines, 1903–36,” *Journal of African History* 34(1993): 271–292.

91. Jean-Patrick Leger, “Occupational Diseases in South African Mines—A Neglected Epidemic,” *South African Medical Journal* 81(1992): 197–201.

92. Karl Figlio, “What is an Accident?” in *The Social History of Occupational Health*, ed. Paul Weindling (London: Routledge Kegan & Paul, 1985), 189.